User Manual

VG40 Video Googgle

ICS Chartr 200

Data management | Hearing assessment | Fitting & Testing | Balance assessment

GN Otometrics

ICS Chartr 200

VG40 Video Goggle

User Manual

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GN Otometrics

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Technical support
Please contact your supplier.

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1 General Notes and Connecting the Device

1.1 Introduction

Before using the device, please take a few moments to read this User Manual, paying particular attention to the safety notices.

1.2 Intended Use

The video goggle is designed to monitor the eye movements. Two infrared cameras record video images of a single eye (monocular recording) or of both eyes (binocular recording).

For further evaluation, the video signals are transmitted to a computer system which analyses the eye movements.

1.3 Safety Notices

The safety notices are designed for the safety of not only the patient and user, but also for the safety of the device. For greater visibility, the safety notices are framed and accompanied by the word **Warning!** or **Caution!**

WARNING!
Denotes a possible danger that could result in injury to the user or patient.

Caution!
Denotes the possibility of damage to the device or of a faulty measurement resulting from improper use.

1.3.1 Manufacturer

GN Otometrics A/S
Dybendalsvaenget 2
P.O. Box 119
DK-2630 Taastrup
Denmark

Tel: +45 72 111 555
Fax: +45 72 111 548

info@gnotometrics.dk
www.gnotometrics.com

1.4 Packaging, Transport, Storage

The video goggle is securely packaged in a box with inserts to protect the unit during transport. Save the packing material for storage and transport of the Goggle.

In most cases, the product will be delivered to you by one of our sales staff. Otherwise it will be shipped by post or through a forwarding agent.

> ***Note:***
> Upon receipt, please check the package for visible external damage. If you find any, please notify the shipper immediately!
>
> If you intend to store or temporarily store the unit on your premises, please ensure that it is stored in a dry room and is not subjected to temperatures outside the range -10°C - 45°C (15F - 120F).

1.5 Disposal and Recycling

The Video Goggle Type 1047 may be disposed of as normal electronic waste according to local regulations.

1.6 Connecting the Video Goggle to the Video Eye Analyser System

The VG40 Video Goggle is designed to be connected to a video eye analyser system.

Please see the video eye analyser system User Manual for your system for connection instructions.

1.7 Symbols

	This symbol indicates that the VG40 Video Goggle complies with Type BF of EN 60601-1.
CE xxxx	The VG40 device is CE-marked according to the Medical Devices Directive 93 / 42 / EEC.
	The instrument is marked with this symbol to indicate that it is electronic equipment covered by the Directive 2002/96/EC on waste electrical and electronic equipment (WEEE).
	This symbol indicates that the user should refer to the associated warnings in this manual.
	This symbol indicates that the VG40 Video Goggle meets standards of insulation equivalent to Class II in accordance with EN60601-1.
⎓	This symbol indicates that the VG40 Video Goggle that it is suited for direct current only.

1.8 Repairs

Only authorised, qualified staff may make repairs to the device. This excludes replacement of the face cushion or headband.

1.9 Service

Even the best electronic device can fail. Our service departments are there to provide you with speedy assistance in such an eventuality.

1.9.1 Service address

If there is a defect, please consult our service departments directly at our branch offices or at our main office at the address and numbers listed below:

GN Otometrics A/S
Dybendalsvaenget 2
P.O. Box 119
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Tel: +45 72 111 555
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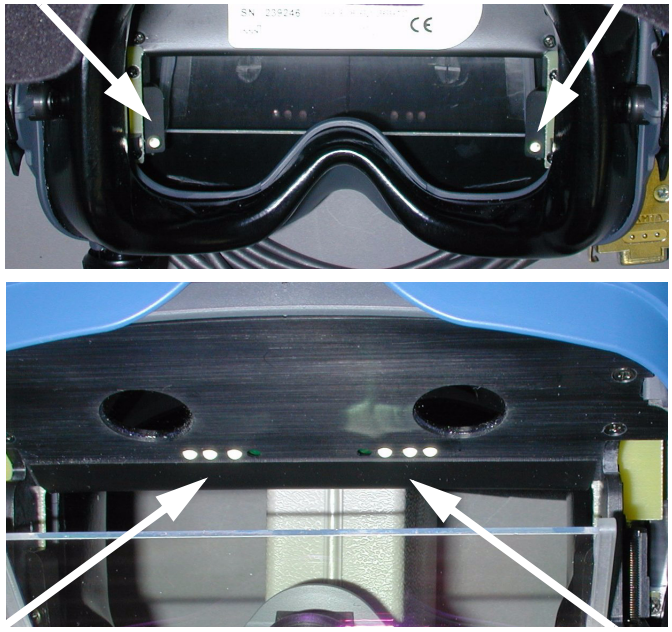
2 Using the VG40 Video Goggle

2.1 How the Video Goggle functions

The video goggle contains two infrared cameras. These are located to the left and right, above each eye.

Two infrared LEDs below the eyes, one on each side, and 6 LEDs above the eyes ensure proper lighting of each eye. See the positions below.



The infrared light makes video recording possible in complete darkness, even when the visor of the video goggle is closed.

Through a process of deflection by the infrared mirror, the video cameras record the eyes and transmit the video images to the video analyser system for further processing.

2.2 Putting the Video Goggle On

Hold the goggle in one hand, taking the head band at the back in your other hand. Now take care to place the goggle on the patient's nose in such a way that he/she is able to breathe easily through the nose. Only then should you pull the head band around the back of the patient's head.

	WARNING! **Risk of injury!** The infrared mirror may be damaged if the video goggle is dropped. If the mirror in the goggle is cracked or broken, do not use the goggle. Please contact our service department.

2.3 Adjusting the Video Goggle

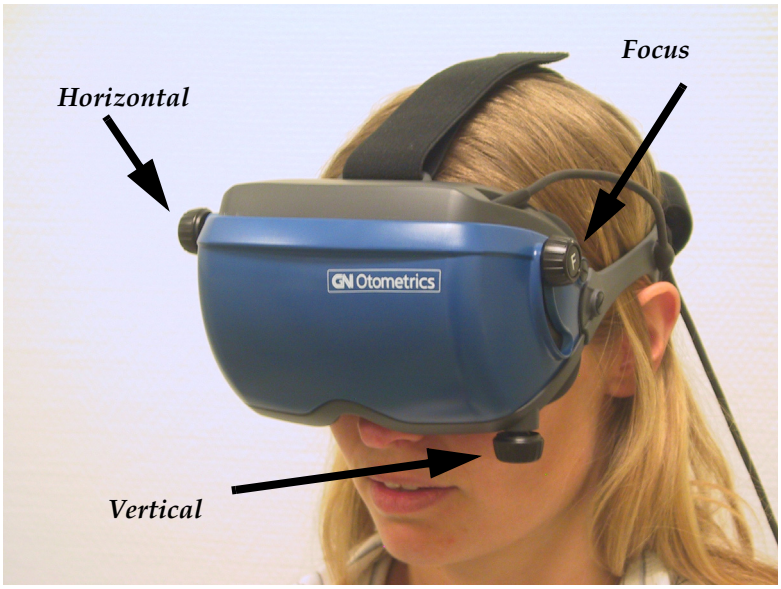
Once the video goggle has been placed comfortably on the patient's face, take a look at the video image of the right or left eye before beginning the test.

In general, the following applies: if the whole eye is visible on the video analyser monitor, no adjustment will be necessary.

If the pupil is too far off-centre, the video analyser may not be able to make a reliable and stable detection of the pupil location. In that case, make a horizontal or vertical adjustment to move the pupil more towards the centre of the video image (see the following section).

2.3.1 Horizontal Eye Position (Symbol H)

*Turning knob **H** on the right side of the goggle (where the right eye is located) allows you to move the video cameras horizontally and thus centre the video image of both eyes.*



2.3.2 Vertical Eye Position (Symbol V)

The vertical position of the video cameras is adjusted by turning knob **V** under the left eye.

2.3.3 Focus (Symbol F)

The Focus knob **F** on the upper left side of the goggle (above the left eye) allows you to adjust the focus of the video image. The adjust-

ment affects the left and right camera and thus the video image of the left and right eye simultaneously.

2.4 Video Goggle with Visor Open

For vestibular tests in which the patient needs to see clearly, as in calibration and optokinetic testing, simply lift the visor until it snaps in lock at fully open position.

2.5 Video Goggle with Visor Closed

For all vestibular tests in which the patient has to be prevented from fixing his/her gaze, the visor must remain closed.

Caution!
Prevent gaze fixation!
To prevent the patient from fixing his/her gaze, it is essential to make sure that the visor is closed completely.

2.6 Cleaning and disinfection

Caution!
Avoid damage to the video cameras!
Jolting or dropping the goggle can damage the sensitive optics of the camera.

2.6.1 Cleaning the Goggle and the Infrared Mirrors

To clean the body of the goggle, use a slightly dampened cloth and conventional household plastic cleaner.

The infrared mirrors may be cleaned with conventional eyeglass cleaner only.

Should the goggle fog up, use a demisting solution, which can be obtained from your GN Otometrics dealer (see also Chapter 3, "Troubleshooting").

2.6.2 Disinfecting the Face Cushion

Use alcohol pads (saturated with 70 % isopropyl alcohol, for example) to clean and disinfect the mask, particularly the face cushion.

2.7 Replacing the Face Cushion

If the face cushion should need replacing after long use, you can order replacements at one of our branch offices.

To remove the pad, simply nudge it inwards (away from the casing) with your thumb. After you have done this at several points, you can simply lift out the padding.

When inserting the new cushion, make sure that the inner and outer seams of the pad fit completely into the grooves on the outside and inside of the casing.

2.8 Replacing the Head Band

The head band has a Velcro closure. Open this to pull the band out of the eyelets on top of the goggle and at the earpieces. Reverse the process to insert the new head band.

3 Troubleshooting

Problem: ***No video signal on the video monitor***

Possible cause:
- Missing or unreliable cable connection between video analyser and goggle.

Solution: Check the cable connections. Power connection can be checked by turning on the fixation LED and look into the goggle from the outside. A faint green glow should appear from the small holes right below the round black windows.

Problem: ***Video image on monitor hazy, dark or noisy***

Possible cause:
- Cameras may be out of focus.

Solution: Adjust the focus with the focus adjustment knob until the image is sharp. Ensure that the headstrap is neither too tight nor too loose, since this could result in the correct focus position being outside the adjustment range.

Possible cause:
- The infrared mirrors of the video goggle are steamed up because the patient has perspired under the mask.

Solution: Clean the infrared mirrors with an eyeglass cleaner, spray them with a de-misting spray and then wipe dry in a circular motion with a soft cloth.

> ***Caution!***
> Avoid damage to the mirror and mirror mount!
> Take great care not to apply excessive force when cleaning the mirror. This may result in damage to the mirror coating or to the mirror mounts.

Possible cause
- One or more of the infrared LEDs are blocked, reducing the illumination of the eye.

Solution: Clean the surface of the central and side LED's. If the problem persists, the LED's may be defective. Contact you local GN Otometrics dealer for service.

Problem: ***The video image is clear and crisp, but the video analyser cannot reliably detect the position of the pupil***

Possible cause
- The eye position is too far outside the optimal area.

Solution: Adjust the eye position by turning the knobs on the outside of the goggle.

Possible cause
- If there is mascara on the eyelashes, the video analyser position markers can get "stuck" on the eyelashes.

Solution: Remove the eye makeup. If possible, patients should be asked to come without makeup on.

4 Technical Data

4.1 Definition of types

VG40 corresponds to GN Otometrics A/S Type 1047

4.2 Mechanical Construction

Weight:	320 g
Size (h x w x d):	12 x 18 x 12 cm

4.3 Patient Interface

Distance pupil to pupil:	60 ± 8 mm
Distance eye to forehead:	22 ± 3 mm
Nose width:	30 ± 10 mm
Horizontal range of viewing angle (visor open):	± 55°
Vertical range of viewing angle (visor open):	± 30°

4.4 Measurement Resolution

Horizontal measurement resolution:	0.4 °
Vertical measurement resolution:	0.4°

4.5 Video Camera

Number of cameras:	2
Outgoing signal:	Monochrome NTSC
Operation mode:	Frame synchronised
Image sensor size:	1/4" (3.3 x 2.5 mm^2 active area)
Horizontal resolution:	320 pixels
Vertical resolution:	240 pixels
Frame rate:	60 Hz

4.6 Power Supply

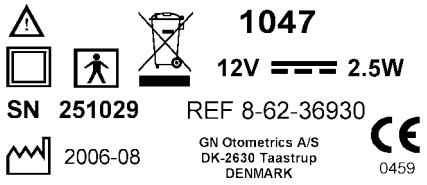
⚠	Supply voltage:	12 V DC ± 10 %, in accordance with EN 60601-1
	Power consumption:	2.5 W ± 10 %

4.7 Laser/LED

Laser/LED product:	CLASS 1 LED product
Maximum measured LED output:	470 µW
Classification standard:	IEC 60825-1, edition 1.2: 2001
Infrared light wavelength:	950nm

Caution!
Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

4.8 Equipment Label



4.9 Environmental Conditions

Operation ambient temperature:	0 to + 40 °C, 30 - 105 °F
Storage ambient temperature:	-10 to + 45 °C, 15 - 120 °F
Transport ambient temperature:	-10 to + 45 °C, 15 - 120 °F
Relative ambient humidity:	up to 85 %

4.10 Standards

Safety: EN 60601-1, Class II, Type BF, IPX0

Electromagnetic compatibility: EN 60601-1-2

Systems: EN 60601-1-1

Notes on EMC (Electromagnetic Compatibility)

- The VG40 Video Goggle is part of a medical electrical system and is thus subject to special safety precautions.

  For this reason, the installation and operating instructions provided in the User Manual of the Video Analyser and in this document should be followed closely.

- Portable and mobile high-frequency communication devices, such as mobile phones, may interfere with the functioning of the video goggle.

Guidance and manufacturer's declaration - electromagnetic emissions for all equipment and systems		
The video goggle 1047, VG40 is intended for use in the electromagnetic environment specified below. The customer or the user of the video goggle 1047, VG40 should assure that it is used in such an environment.		
Emissions test	***Compliance***	***Electromagnetic environment-guidance***
RF emissions CISPR 11	Group 1	The VG40 video goggle 1047 uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class B	The VG40 video goggle 1047 is suitable for use in all environments, including domestic environments and those directly connected to public low-voltage power supply networks that supplies buildings used for domestic purposes
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations/flicker emissions IEC 61000-3-3	Complies	

Guidance and manufacturer's declaration - electromagnetic immunity ***for all equipment and systems***			
The video goggle 1047, VG40 is intended for use in the electromagnetic environment specified below. The customer or user of the video goggle 1047, VG40 should assure that it is used in such an environment.			
Immunity test	***IEC 60601 test level***	***Compliance level***	***Electromagnetic environment - guidance***
Electrostatic discharge (ESD) IEC 61000-4-2	+/- 6 kV contact +/- 8 kV air	+/- 6 kV contact +/- 8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %.
Electrical fast transient/burst IEC 61000-4-4	+/- 2 kV for power supply lines +/- 1 kV for input/ output lines	+/- 2 kV for power supply lines +/- 1 kV for input/ output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	+/- 1 kV differential mode +/- 2 kV common mode	+/- 1 kV differential mode +/- 2 kV common mode	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	< 5 % U_T (> 95 % dip in U_T) for 0,5 cycles 40 % U_T (60 % dip in U_T) for 5 cycles 70 % U_T (30 % dip in U_T) for 25 cycles < 5 % U_T (> 95 % dip in U_T) for 5 sec	< 5 % U_T (> 95 % dip in U_T) for 0,5 cycles 40 % U_T (60 % dip in U_T) for 5 cycles 70 % U_T (30 % dip in U_T) for 25 cycles < 5 % U_T (> 95 % dip in U_T) for 5 sec	Mains power quality should be that of a typical commercial or hospital environment. If the user of the video goggle 1047, VG40 requires continued operation during power mains interruptions, it is recommended that the video goggle 1047, VG40 be powered from an uninterruptible power supply or a battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristics of a typical location in a typical commercial or hospital environment.
NOTE U_T is THE A:C: Mains voltage prior to application of the test level.			

Guidance and manufacturer's declaration - electromagnetic immunity - for equipment and systems that are not LIFE_SUPPORTING			
The video goggle 1047, VG40 is intended for use in the electromagnetic environment specified below. The customer or user of the video goggle 1047, VG40 should assure that it is used in such an environment.			
Immunity test	***IEC 60601 test level***	***Compliance level***	***Electromagnetic environment - guidance***
Conducted RF IEC 61000-4-6 Radiated RF IEC 61000-4-3	3 Vrms 150 kHz to 80 MHz outside ISM bands [a] 3 V/m 80 MHz to 2,5 GHz	3 Vrms 3 V/m	Portable and mobile RF communications equipment should be used no closer to any part of the video goggle 1047, VG40, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. **Recommended separation distance:** $d = 1,2 \sqrt{P}$ $d = 1,2 \sqrt{P}$ for 80 MHz to 800 MHz $d = 2,3 \sqrt{P}$ for 80 MHz to 2,5 GHz, where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in metres (m). [b] Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, [c] should be less than the compliance level in each frequency range. [d] Interference may occur in the vicinity of equipment marked with the following symbol:
NOTE1 At 80 MHz and 800 MHz the higher frequency range applies. **NOTE2** These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			

a The ISM (industrial, scientific and medical) bands between 150 kHz and 80 MHz are 6,765 MHz to 6,795 MHz; 13,553 MHz to 13,567 MHz; 26,957 MHz to 27,283 MHz; and 40,66 MHz to 40,70 MHz.

b The compliance levels in the SMI frequency bands between 150 kHz and 80 MHz and in the frequency range 80 MHz to 2,5 GHz are intended to decrease the likelihood that mobile/portable communications equipment could cause interference it is inadvertently brought into patient areas. For this reason, an additional factor of 10/3 is used in calculating the recommended separation distance for transmitters in these frequency ranges.

c Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the video goggle 1047, VG40 is used exceeds the applicable RF compliance level above, the video goggle 1047, VG40 should be observed to verify normal operation. If abnormal performance is observed, additional measures might be necessary, such as reorienting or relocating the video goggle 1047, VG40.

d Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

Recommended separation distances between portable and mobile RF communications equipment and the video goggle 1047, VG40

Rated maximum output power of transmitter W	Separation distance according to frequency of transmitter m		
	150 kHz to 80 MHz outside ISM bands $d = 1,2 \sqrt{P}$	80 MHz to 800 MHz $d = 1,2 \sqrt{P}$	800 MHz to 2,5 GHz $d = 2,3 \sqrt{P}$
0,01	0,12	0,12	0,23
0,1	0,38	0,38	0,73
1	1,2	1,2	2,3
10	3,8	3,8	7,3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in metres (m) can be estimated using the equitation applicable to the frequency of the transmitter, where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE1
At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

NOTE2
These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.